1. A ceramic dispersoid in metal product, comprising:

(a) at least about 50 volume percent of a matrix metal of aluminum; and

(b) up to about 50 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix, wherein said finely sized ceramic phase particles have an average particle diameter of less than about 2.5 microns, and wherein said uniform distribution consists of a substantially cluster-free distribution of no more than two particles attached to one another at a magnification of 500X, wherein said ceramic dispersoid in metal product is formed by the process of providing said metal matrix in a liquid state containing liquid titanium and reacting a salt bath containing carbon with said liquid titanium element to form said uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix.

2. The ceramic dispersoid in metal product as set forth in Claim 1, wherein said finely sized ceramic phase particles comprise titanium carbide particles having an average particle diameter of less than about 1 micron formed and dispersed in situ in said aluminum metal matrix.

3. The ceramic dispersoid in metal product as set forth in Claim 2, comprising up to about 40 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix.

4. The ceramic dispersoid in metal product as set forth in Claim 3, wherein said finely sized ceramic phase particles comprise titanium carbide particles having an average particle diameter of less than about 0.3 micron formed and dispersed in situ in said aluminum metal matrix.

5. The ceramic dispersoid in metal product as set forth in Claim 4, comprising up to about 30 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix.

6. The ceramic dispersoid in metal product as set forth in Claim 1 comprising up to about 40 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix.

7. The ceramic dispersoid in metal product as set forth in Claim 6, wherein said reacting step comprises vigorously stirring to

form a mixture of said liquid titanium in contact with a portion of said carbon particles at an elevated temperature for sufficient residence time to form said uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said metal matrix.

8. A ceramic dispersoid in metal product as set forth in Claim 1 formed by a method of forming finely sized carbide phase particles formed in situ in a molten metal or metal alloy, comprising:

(a) providing a molten matrix liquid of molten metal or metal alloy containing a carbide-forming liquid of Ti;

(b) providing a halide salt containing carbon particles; and

(c) reacting said halide salt containing carbon particles in said molten metal or metal alloy with said carbide-forming liquid to form a uniform distribution of finely sized ceramic phase particles formed and dispersed in-situ in a metal matrix.

9. A ceramic dispersoid in metal product as set forth in Claim 8 formed by the method wherein said step of reacting said halide salt containing carbon particles in said molten metal or metal

alloy comprises vigorously stirring said molten matrix liquid and said halide salt containing carbon particles to form a mixture of said carbide-forming liquid in contact with a portion of said carbon particles at an elevated temperature for sufficient residence time to form a uniform distribution of finely sized ceramic phase particles formed and dispersed in-situ in a metal matrix.

10. A ceramic dispersoid in metal product as set forth in Claim 1, comprising less than about 10 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix.

11. A ceramic dispersoid in metal product as set forth in Claim 1, comprising less than about 5 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix.

12. A ceramic dispersoid in metal product as set forth in Claim 1, comprising less than about 0.5 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase

particles formed and dispersed in-situ in said aluminum metal matrix.

13. A ceramic dispersoid in metal product by process, comprising:

(a) at least about 70 volume percent of a matrix metal of aluminum; and

(b) up to about 30 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix, wherein said finely sized ceramic phase particles have an average particle diameter of less than about 2.5 microns, and wherein said uniform distribution consists of a substantially cluster-free distribution of no more than two particles attached to one another at a magnification of 500X, wherein said finely sized ceramic phase particles are formed and dispersed in-situ in said metal matrix by the process of:

(i) providing a molten composition consisting essentially of molten aluminum metal liquid and molten Ti metal liquid, wherein said molten Ti metal liquid is provided in said molten composition as a liquid and not as a powder;

(ii) providing a chloride salt containing fine carbon particles; and

(iii) reacting said chloride salt containing fine carbon particles in said molten aluminum metal liquid with said molten Ti metal liquid to form said uniform distribution of finely sized titanium carbide particles formed and dispersed in-situ in an aluminum metal matrix.

14. The ceramic dispersoid in metal product by process as set forth in Claim 13, wherein said step of reacting said halide salt containing carbon particles in said molten metal or metal alloy comprises vigorously stirring said molten matrix liquid and said halide salt containing carbon particles to form a mixture of said carbide-forming element in contact with a portion of said carbon particles at an elevated temperature for sufficient residence time to form a uniform distribution of finely sized ceramic phase particles formed and dispersed in-situ in a metal matrix.

15. The ceramic dispersoid in metal product by process as set forth in Claim 13, wherein said finely sized titanium carbide ceramic phase particles comprise titanium carbide particles having an average particle diameter of less than about 0.3 microns formed in situ in metal.

16. The ceramic dispersoid in metal product by process as set forth in Claim 13, said process further comprising (d) controlling and selecting said salt to have a liquidus temperature lower than that of said molten aluminum metal.

17. The ceramic dispersoid in metal product by process as set forth in Claim 16, wherein said step of controlling and selecting said salt further comprises selecting said salt for the purpose of wetting said carbon particles.

18. The ceramic dispersoid in metal product by process as set forth in Claim 17, wherein said residence time is less than one hour.

19. The ceramic dispersoid in metal product by process as set forth in Claim 18, wherein said salt comprises halide salts of alkali and alkaline earth metals.

20. The ceramic dispersoid in metal product by process as set forth in Claim 19, wherein said salt comprises a eutectic melt of NaCl-KCl with minor amounts of $MgCl_2$ and $CaCl_2$.

21. The ceramic dispersoid in metal product by process as set forth in Claim 20, wherein said salt has a melting point below about 600°C, a NaCl and KCl weight/weight ratio within the range of about 0.8-1.2, and the additives of $MgCl_2$ and $CaCl_2$ comprise up about 5-10% by weight of the salt mixture.

22. The method as set forth in Claim 21, wherein said salt has a eutectic of about 600°C - 700°C.

23. The method as set forth in Claim 22, wherein said salt contains about 48% NaCl, 48% KCl, 2.2% $MgCl_2$, and 1.8% $CaCl_2$ by weight.

24. A ceramic dispersoid in metal product by process, comprising:

(a) at least about 70 volume percent of a matrix metal of aluminum; and

(b) up to about 30 volume percent of a uniform distribution of finely sized titanium carbide ceramic phase particles formed and dispersed in-situ in said aluminum metal matrix, wherein said finely sized ceramic phase particles have an average particle diameter of less than about 0.3 micron, and wherein said uniform distribution consists of a cluster-free distribution of no more

than two particles attached to one another at a magnification of 500X, wherein said finely sized ceramic phase particles are formed and dispersed in-situ in said metal matrix by the process of:

(a) providing a molten composition comprising a matrix liquid of molten aluminum or aluminum alloy metal and Ti;

(b) providing a chloride salt containing carbon particles, wherein said salt comprises NaCl and KCl in a weight/weight ratio within the range of about 0.8-1.2 and of $MgCl_2$ and $CaCl_2$ in amounts comprising up to about 5 - 10% by weight of the salt mixture; and

(c) reacting said chloride salt containing carbon particles in said molten matrix liquid of molten metal by vigorously stirring said molten matrix liquid and said chloride salt containing carbon particles to form a mixture of said carbide-forming element in contact with a portion of said carbon particles at an elevated temperature above about 980°C for a residence time less than one hour to form a uniform distribution of finely sized ceramic phase particles having an average particle diameter of less than about 0.3 microns formed and dispersed in-situ in an aluminum or aluminum alloy metal matrix.

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